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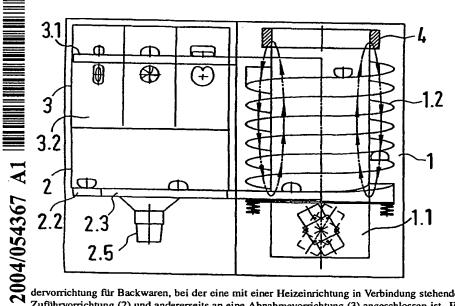
#### Veröffentlicht:

mit internationalem Recherchenbericht

Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

(54) Title: CONVEYING DEVICE FOR BAKED GOODS

(54) Bezeichnung: FÖRDERVORRICHTUNG FÜR BACKWAREN



(57) Abstract: The invention relates to a conveying device for baked goods in which a conveying unit (1) that is connected to a heating device is also connected to a supplying device (2) and to a removal device (3). A simple and compact design is obtained by virtue of the fact that the conveying unit (1) has a helical surface (1.2), which can be vibrated by means of a vibrating drive (1.1) and which is provided for conveying the baked The supplying goods upward. device is connected in the lower area of the conveying unit (1), and the removal device is connected in the upper area of the conveying unit (1).

(57) Zusammenfassung: Die Erfindung bezieht sich auf eine För-

dervorrichtung für Backwaren, bei der eine mit einer Heizeinrichtung in Verbindung stehende Fördereinheit (1) einerseits an eine Zuführvorrichtung (2) und andererseits an eine Abnahmevorrichtung (3) angeschlossen ist. Ein einfacher kompakter Aufbau wird dadurch erreicht, dass die Fördereinheit (1) eine mittels eines Schwingantriebs (1.1) in Vibration versetzbare Wendelfläche (1.2) zum Aufwärtstransport der Backwaren aufweist, wobei die Zuführvorrichtung im unteren Bereich und die Abnahmevorrichtung im oberen Bereich der Fördereinheit (1) angeschlossen ist.

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#### Fördervorrichtung für Backwaren

Die Erfindung bezieht sich auf eine Fördervorrichtung für Backwaren, bei der eine mit einer Heizeinrichtung in Verbindung stehende Fördereinheit einerseits an eine Zuführvorrichtung und andererseits an eine Abnahmevorrichtung angeschlossen ist.

Derartige Fördervorrichtungen für Backwaren sind beispielsweise als Förderband ausgebildet.

Der Erfindung liegt die Aufgabe zugrunde, eine Fördervorrichtung für Backwaren der eingangs genannten Art so auszubilden, dass der Aufbau kompakt und einfach ist und eine zuverlässige Förderung ergibt.

Diese Aufgabe wird mit den Maßnahmen des Anspruches 1 gelöst. Hiernach ist vorgesehen, dass die Fördereinheit eine mittels eines Schwingantriebs in Vibration versetzbare Wendelfläche zum Aufwärtstransport der Backwaren aufweist, wobei die Zuführvorrichtung im unteren Bereich und die Abnahmevorrichtung im oberen Bereich der Fördereinheit angeschlossen ist.

Vorteilhafte Ausgestaltungen sind in den Unteransprüchen angegeben. Die Steigung der Wendelfläche kann dabei leicht geeignet gewählt werden, um mit dem Schwingantrieb die gewünschte Fördergeschwindigkeit zu erreichen. Auch können die durch den Schwingantrieb für die Förderung erzeugten Vibrationen in Form und Intensität der gewünschten Fördergeschwindigkeit auch unter Berücksichtigung der Art der Backwaren angepasst werden.

Eine vorteilhafte Ausgestaltung besteht dabei darin, dass der hohle, insbesondere zylinderförmige Mittelabschnitt in einen über die Wendelfläche führenden Umluftheizkreis einbezogen ist, wobei die Heizluft und über die Wendeln nach unten geleitet wird und in dem hohlen Mittelabschnitt nach oben strömt, um die Backwaren in gewünschter Weise zu erwärmen.

Eine weitere vorteilhafte Ausgestaltung besteht darin, dass die Wendelfläche einige, z.B. jeweils nach 400° eine Stufe aufweist, wobei die Stufen so ausgebildet sind, dass die Backwaren beim Überschreiten der Stufe gewendet werden.

Eine vorteilhafte Ausgestaltung der Fördereinheit besteht darin, dass der Schwingantrieb zwei Unwucht-Antriebseinheiten aufweist, deren Kraftvektoren schräg zur Vertikalen und schräg zueinander ausgerichtet sind. Dieser Aufbau des Schwingantriebs ergibt bei kleiner Bauform einen relativ hohen Wirkungsgrad. Dabei können relativ niedrige Frequenzen und eine damit verbundene geringe Beschleunigung gewählt werden, wodurch der Antrieb auch relativ leise arbeitet.

Ist vorgesehen, dass die Abnahmevorrichtung oberhalb der Zuführvorrichtung auf derselben Seite der Fördereinheit angeordnet ist, ergeben sich eine günstige Anordnung für die Bedienung beim Beladen und bei der Entnahme und günstige Positioniermöglichkeiten der Vorrichtung.

Die Funktion und Bedienung werden weiterhin dadurch begünstigt, dass die Zuführvorrichtung einen an die Fördereinheit angeschlossenen Zuführabschnitt aufweist, der mit einer Vereinzelungsfunktion versehen ist, und eine zu diesem abwärts führende, schräg gestellte oder schräg stellbare Beladeeinheit aufweist.

Ferner sind für die Funktion die Maßnahmen von Vorteil, dass der Zuführabschnitt und die Beladeeinheit mittels eines gemeinsamen Zuführantriebs oder getrennter Zuführantriebe zum Zuführen der Backwaren antreibbar sind. Die oft noch gefrorenen und kalten Roh-Backwaren werden mit diesen Maßnahmen zuverlässig von der Beladeeinheit zu dem Zuführabschnitt und von dort in die Fördereinheit transportiert.

Ist vorgesehen, dass die Zuführvorrichtung einen an den Zuführabschnitt angeschlossenen Einzelbeladeabschnitt aufweist, können in einen Backablauf nach Wunsch eines Benutzers Backwaren eingeführt werden.

Für die Funktion und Bedienung der Vorrichtung sind des Weiteren die Maßnahmen vorteilhaft, dass die Abnahmevorrichtung einen an den oberen Endbereich der Wendelfläche angeschlossenen Abnahmeabschnitt und einen schräg nach unten zu einer Entnahmevorrichtung führenden Austragabschnitt aufweist.

Eine für den Betrieb der Vorrichtung vorteilhafte Ausgestaltung besteht ferner darin, dass die Wärme der in der Abnahmevorrichtung befindlichen Backwaren zum Teil zu den in der Zuführvorrichtung befindlichen Backwaren geführt ist.

Die Erfindung wird nachfolgend anhand von Ausführungsbeispielen unter Bezugnahme auf die Zeichnungen näher erläutert. Es zeigen:

#### Fig. 1A bis 1D

verschiedene Ansichten eines ersten Ausführungsbeispiels einer Fördervorrichtung für Backwaren in Vorderansicht, Seitenansicht von links, Draufsicht auf eine obere Ebene mit Abnahmevorrichtung und eine Draufsicht auf eine untere Ebene mit Zuführvorrichtung,

Fig. 2 verschiedene Ansichten eines weiteren Ausführungsbeispiels der Fördervorrichtung in einer Vorderansicht, seitlichen Ansicht von links und einer Draufsicht und

Fig. 3 einen Ausschnitt einer Fördereinheit nach den Fig. 1A bis 1D und 2.

Die Fig. 1A bis 1D zeigen vier verschiedene Ansichten einer Fördervorrichtung, nämlich von vorne, von einer Zuführseite aus und zwei Ansichten von oben, wobei Fig. 1C eine untere Zuführebene und Fig. 1D eine obere Abnahmeebene zeigen. Die Backwaren werden als Rohware von einer Zuführvorrichtung 2 aus in eine im unteren Bereich einer Fördereinheit 1 angeordneten Schleuse 1.6 in der Fördereinheit 1 zugeführt und von dieser über eine weitere Schleuse 3.4 im oberen Bereich z.B. auf derselben Seite (Fig. 1A bis 1D) oder gegenüberliegenden Seite (Fig.

2) bezüglich der Zuführvorrichtung 2 über eine Abnahmevorrichtung 3 wieder herausgeführt.

Die Fördereinheit 1 weist eine um einen hohlen zylindrischen Mittelabschnitt 1.3 mehrfach gewundene Wendelfläche 1.2 auf, die, wie aus Fig. 3 ersichtlich, mehrere Wende-Stufen 1.5 besitzt. Unterhalb der Wendelfläche 1.2 ist im unteren Bereich der Födereinheit 1 ein Schwingantrieb 1.1 angeordnet, um die Wendelfläche in die Backwaren nach oben befördernde Vibrationsbewegungen zu versetzen. Der Schwingantrieb 1.1 besitzt dabei z.B. zwei Antriebseinheiten, die um eine jeweilige Achse rotierende Unwuchten aufweisen, wobei die Vektoren der durch die Unwuchten erzeugten Kraftkomponenten schräg zueinander und z.B. in gleichem Winkel zur Vertikalen ausgerichtet sind, um die gewünschte Aufwärtsförderung über die Wendelfläche 1,2 zu bewirken. Denkbar wären auch Magnetvibratoren. Beim Überqueren der Stufen werden durch deren Abstimmung auf die Eigenschaften der Backwaren, die Vibrationsbewegungen sowie die Steigung der Wendelfläche 1.2 die Backwaren gewendet und in der gewendeten Lage bis zur nächsten Stufe weiter befördert, um sie dort abermals zu wenden. Pro Umlauf um z.B. 400° der Wendelfläche 1.2 können mehrere Stufen, z.B. zwischen zwei und zehn Stufen oder gewünschtenfalls auch weniger vorgesehen sein.

Die Fördereinheit 1 dient auch der Aufwärmung der Backwaren, wobei die Heizluft von einer z.B. oben befindlichen Heizvorrichtung 4 aus in einem Umluftheizkreis 1.4 über die Wendelfläche 1.2 nach unten und durch das Innere des Mittelabschnitts 1.3 wieder nach oben geführt wird.

Wie aus den Fig. 1A bis 1D weiterhin ersichtlich, weist die Zuführvorrichtung 2 verschiedene Zuführabschnitte, nämlich einen an die Einführ-Schleuse 1.6 ange-

schlossenen Zuführabschnitt 2.3, dem von einer Beladeeinheit 2.4 und/oder einem Einzelbeladeabschnitt 2.1 beispielsweise über einen daran angeschlossenen Umlenkabschnitt 2.2 Roh-Backwaren zugeführt werden können. Der Einzelbeladeabschnitt 2.1 ist dabei z.B. auf einer einer Entnahmevorrichtung 3.3 für die fertigen Backwaren gegenüberliegenden Rückseite der Fördervorrichtung angeordnet und ermöglicht es, nach Wunsch einer Bedienperson oder eines Kunden in einen Backprozess nach Art und Anzahl verschiedene Backwaren einzuschleusen.

Die Beladeeinheit 2.4 ist z.B. als schwenkbarer Zuführbehälter ausgebildet, der zum Beladen in eine waagrechte und zum Zuführen der eingefüllten Roh-Backwaren in eine zu dem Zuführabschnitt 2.3 geneigte Stellung schwenkbar ist. Die Zuführung der Roh-Backwaren aus der Beladeeinheit 2.4 zu dem Zuführabschnitt 2.3 erfolgt mittels Schwerkraft über die Schräge und zusätzlich mittels Vibration, so dass die in der Regel noch gefrorenen, kalten Roh-Backwaren sicher und bereits in gewissem Grad vereinzelt zu dem Zuführabschnitt 2.3 transportiert werden und dann von dem Zuführabschnitt 2.3 unter weiterer Vereinzelung durch Schikanen (Abweiser) zu der Fördereinheit 1 transportiert werden. Der Zuführabschnitt 2 weist vorteilhaft ebenfalls einen Schwingantrieb auf, wofür sich an dieser Stelle ein Magnetvibrator eignet. Die Zuführung von dem Einzelbeladeabschnitt 2.1 über den Umlenkabschnitt 2.2 kann in entsprechender Weise mit einem Schwingantrieb oder aber z.B. mittels eines Umlaufbandes erfolgen. Ein umlaufendes Förderband ist alternativ auch für den Zuführabschnitt 2.3 denkbar.

Die Abnahmevorrichtung 3, die oberhalb der Zuführvorrichtung 2 angeordnet ist, weist einen Abnahmeabschnitt 3.1 auf, der z.B. ebenfalls mit einem Schwingantrieb oder aber mit einem umlaufenden Förderband ausgestattet sein kann. An den Abnahmeabschnitt 3.1 schließt sich z.B. über dessen gesamte Länge bei dem ge-

zeigten Aufbau, die der Breite der gesamten Abnahmevorrichtung 3 und auch Zuführvorrichtung 2 entspricht, ein nach vorne schräg abfallender Austragabschnitt 3.2 an, der in der Entnahmevorrichtung 3.3 mündet. An der Entnahmevorrichtung 3.3 kann z.B. ein Kunde mittels eines daran anschließbaren geeigneten Behälters fertige Backwaren entnehmen. Der Abnahmeabschnitt 3.1 kann mit einer Vereinzelungsvorrichtung, die mit einer Sensorik gekoppelt ist, ausgestattet sein, so dass verschiedene Backwaren sortiert und zugeordneten Entnahmeplätzen zugeführt werden können (Fig. 1A).

Durch die Anordnung der Abnahmevorrichtung 3 oberhalb der Zuführvorrichtung 2 kann die Wärme der insbesondere auf dem Austragabschnitt 3.2 befindlichen Backwaren dazu genutzt werden, die in der Beladeeinheit 2.4 befindlichen Roh-Backwaren anzuwärmen.

Bei dem in Fig. 2 gezeigten Ausführungsbeispiel sind die Zuführvorrichtung 2 und die Abnahmevorrichtung 3 auf zwei gegenüberliegenden Seiten der Fördereinheit 1 angeordnet. Im übrigen kann der Aufbau ähnlich ausgeführt sein, wie bei dem Ausführungsbeispiel gemäß den Fig. 1A bis 1D.

#### Ansprüche

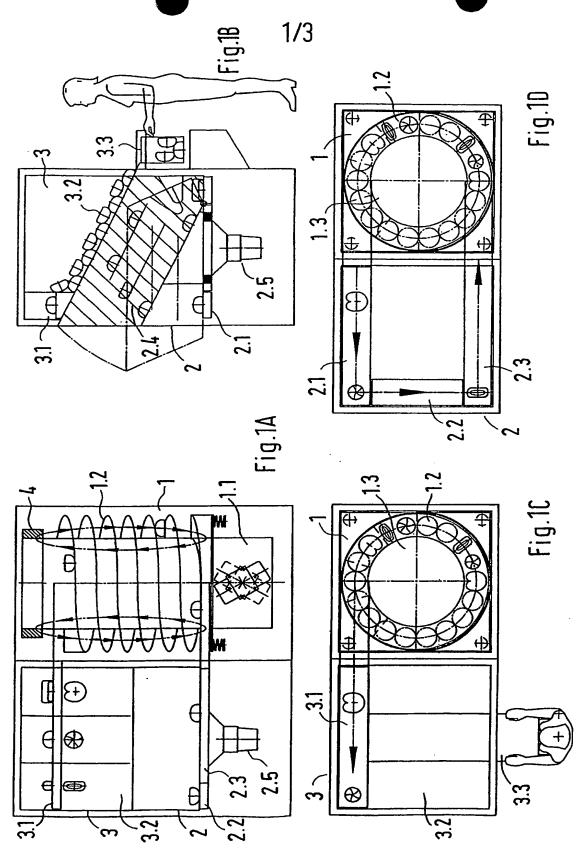
- 1. Fördervorrichtung für Backwaren, bei der eine mit einer Heizeinrichtung in Verbindung stehende Fördereinheit (1) einerseits an eine Zuführvorrichtung (2) und andererseits an eine Abnahmevorrichtung (3) angeschlossen ist, dadurch gekennzeichnet, dass die Fördereinheit (1) eine mittels eines Schwingantriebs (1.1) in Vibration versetzbare Wendelfläche (1.2) zum Aufwärtstransport der Backwaren aufweist, wobei die Zuführvorrichtung (2) im unteren Bereich und die Abnahmevorrichtung (3) im oberen Bereich der Fördereinheit (1) angeschlossen ist.
- Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass die Wendelfläche (1.2) konzentrisch um einen hohlen Mittelabschnitt (1.3) gewunden ist.
- Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, dass der Mittelabschnitt (1.3) in einen über die Wendelfläche (1.2) führenden Umluftheizkreis (1.4) zum Erwärmen der Backwaren einbezogen ist.
- 4. Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet,

dass die Wendelfläche (1.2) einige Stufen (1.5) zum Wenden der Backwaren während ihrer Beförderung aufweist.

- Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass der Schwingantrieb (1.1) zwei Unwucht-Antriebseinheiten aufweist, deren Kraftvektoren schräg zur Vertikalen und zueinander ausgerichtet sind.
- Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die Abnahmevorrichtung (3) oberhalb der Zuführvorrichtung (2) auf derselben Seite der Fördereinheit (1) angeordnet ist.
- 7. Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die Zuführvorrichtung (2) einen an die Fördereinheit (1) angeschlossenen Zuführabschnitt (2.3) aufweist, der mit einer Vereinzelungsfunktion versehen ist, und eine zu diesem abwärts führende, schräg gestellte oder schräg stellbare Beladeeinheit (2.4) aufweist.
- Vorrichtung nach Anspruch 7, dadurch gekennzeichnet, dass die Beladeeinheit (2.4) mittels eines Zuführantriebs (2.5) und der Zuführabschnitt (2.3) mittels eines weiteren Zuführantriebes zum Zuführen der Backwaren antreibbar sind.
- Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet,

dass die Zuführvorrichtung (2) einen an den Zuführabschnitt (2.3) angeschlossenen Einzelbeladeabschnitt (2.1) aufweist.

- 10. Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, dass die Abnahmevorrichtung (3) einen an den oberen Endbereich der Wendelfläche (1.2) angeschlossenen Abnahmeabschnitt (3.1) und einen schräg nach unten zu einer Entnahmevorrichtung (3.3) führenden Austragabschnitt (3.2) aufweist.
- 11. Vorrichtung nach einem der Ansprüche 6 bis 10, dadurch gekennzeichnet, dass die Wärme der in der Abnahmevorrichtung (3) befindlichen Backwaren zum Teil zu den in der Zuführvorrichtung (2) befindlichen Backwaren geführt ist.



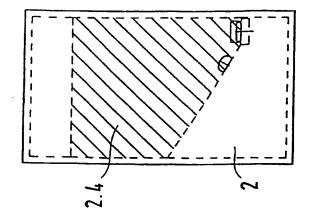
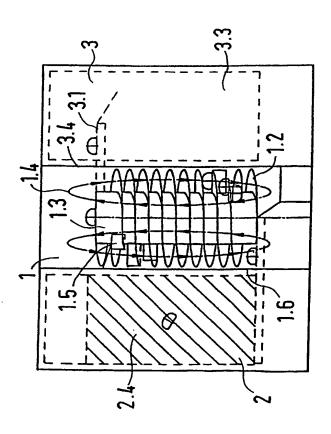
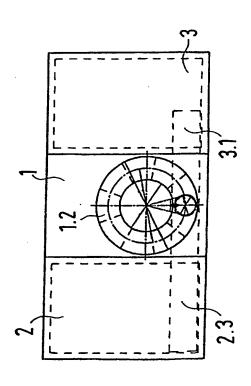


Fig. 2







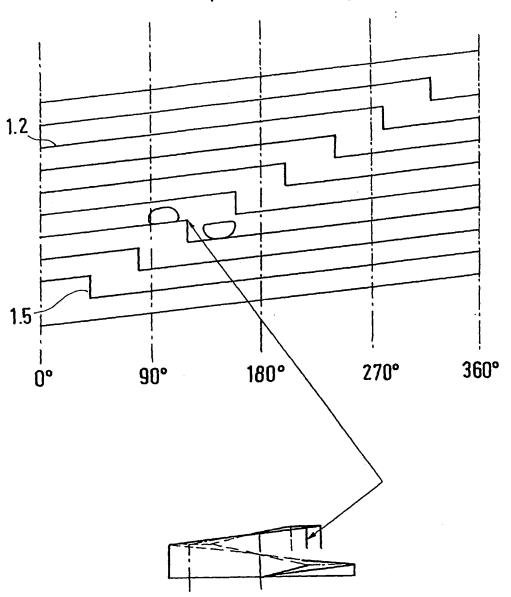


Fig.3

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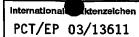
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DE 1	10116423	A	17-10-2002	DE	10116423	A1	17-10-2002
DE 2	20302346	U	17-04-2003	DE	20302346	U1	17-04-2003
DE 1	1152364	В	01-08-1963	KEINE			
US 4	1072093	Α	07-02-1978	CA	1095795		17-02-1981
				CA	1142046		01-03-1983
				DE	2714761		13-10-1977
				DE	2759302		28-06-1979
•				ES	457438		01-03-1978
				FR	2345925 1527467		28-10-1977
				GB IT			04-10-1978 28-05-1985
				JP	1210055	_	29-05-1985
				JP	52125680		29-05-1984
				JP	58039524		30-08-1983
				SE	418447		09-06-1981
				SE	7703824		03-10-1977

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